CLAIMS

1. A method for driving a cholesteric liquid crystal display device in which a cholesteric liquid crystal is driven in a matrix manner by means of a plurality of common electrodes and segment electrodes, the common electrodes and segment electrodes being crossed oppositely, the method comprising the steps of:

writing a display content to the cholesteric crystal by sequentially applying common electrode drive voltage waveforms from the common electrodes to the cholesteric liquid crystal display device, the common electrode drive voltage waveforms including a reset voltage waveform to cause the cholesteric liquid crystal to a homeotropic state, a select voltage waveform to select a final alignment state of the cholesteric liquid crystal, a hold voltage waveform to hold an alignment state selected by the select voltage waveform, and a non-select voltage waveform caused by a matrix drive; and

applying segment electrode drive voltage waveforms from the segment electrodes to the cholesteric liquid crystal display device during the step of writing a display content, the segment electrode drive voltage waveforms including at least an ON voltage waveform for determining the final alignment state of the cholesteric liquid crystal as a planar alignment state, and an OFF voltage waveform for determining the final alignment state as a focal conic state;

wherein the common electrode drive voltage waveforms are formed so that there is no period of time during which the same voltage is applied to all common electrodes at the same time in a period of time from the application of the hold voltage waveform to the first common electrode to the application of the reset voltage waveform to the last common electrodes, during the step of writing a display content, and the segment electrode drive voltage waveforms are formed so that there is a period of time during which the same voltage is applied to all segment electrodes at the same time during the step of writing a display content.

2. The method for driving a liquid crystal display device

according to claim 1, wherein each of the reset, select, hold, non-select, ON and OFF voltage waveforms has the same number of unit intervals, each of the reset, select, hold, non-select voltage waveforms has two levels of voltages in the same unit interval, and each of the ON and OFF voltage waveforms has two or less levels of voltages in the same unit interval.

3. The method for driving a liquid crystal display device according to claim 2, wherein each of the reset, select, hold, and non-select voltage waveforms has two levels of voltages.

4. The method for driving a liquid crystal display device according to claim 2, wherein each of the reset, select, hold, and non-select voltage waveforms has three levels of voltages.

5. The method for driving a liquid crystal display device according to claim 2, wherein each of the reset, select, hold, and non-select voltage waveforms has four levels of voltages.

6. The method for driving a liquid crystal display device according to claim 3, 4 or 5, wherein the maximum voltage value of the reset voltage waveform and the maximum voltage value of the hold voltage waveform are the same.

7. The method for driving a liquid crystal display device according to claim 3, 4 or 5, wherein each of the ON and OFF voltage waveforms has three or four levels of voltages.

8. The method for driving a liquid crystal display device according to claim 4 or 5, wherein each of the ON and OFF voltage waveforms has two levels of voltages.

9. The method for driving a liquid crystal display device according to claim 7, wherein the ON and OFF voltage waveforms and the non-select voltage waveform are the same.

10. The method for driving a liquid crystal display device according to claim 7, wherein the select and non-select voltage waveforms are the same.

11. A cholesteric liquid crystal display apparatus comprising:

a liquid crystal display device in which a plurality of picture

elements are formed at portions crossed by a plurality of common electrode and a plurality of segment electrodes,

a common driver for writing a display content to the picture elements by sequentially applying drive voltage waveforms from the common electrodes to the cholesteric liquid crystal display device, the drive voltage waveforms including a reset voltage waveform to cause the cholesteric liquid crystal to a homeotropic state, a select voltage waveform to select a final alignment state of the cholesteric liquid crystal, a hold voltage waveform to hold an alignment state selected by the select voltage waveform, and a non-select voltage waveform caused by a matrix drive;

a segment driver for applying drive voltage waveforms from the segment electrodes to the cholesteric liquid crystal display device during the step of writing a display content, the drive voltage waveforms including at least an ON voltage waveform for determining the final alignment state of the cholesteric liquid crystal as a planar alignment state, and an OFF voltage waveform for determining the final alignment state as a focal conic state; and

a controller for controlling the common driver and segment driver;

wherein the controller controls the common and segment driver in such a way that each of the reset, select, hold, non-select, ON and OFF voltage waveforms has the same number of unit intervals, each of the reset, select, hold, non-select voltage waveforms has two levels of voltages in the same unit interval, and each of the ON and OFF voltage waveforms has two or less levels of voltages in the same unit interval.

12. The cholesteric liquid crystal display apparatus according to claim 11, wherein the controller controls the common driver in such a way that there is no period of time during which the same voltage is applied to all common electrodes in a period of time from the application of the hold voltage waveform to the first common electrode to the application of the reset voltage waveform to the last common electrodes during a step of writing a display content, and that there is

a period of time during which the same voltage is applied to all segment electrodes during the step of writing a display content.

13. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the common driver in such a way that the voltages applied to the common electrodes have two levels of voltages.

14. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the common driver in such a way that the voltages applied to the common electrodes have three levels of voltages Vh, Vm, V1 (Vh > Vm > V1), and include, for writing a display content, a unit interval during which the voltages applied to the common electrodes have Vh and Vm and a unit interval during which the voltages applied to the common electrodes have Vm and V1.

15. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the common driver in such a way that the voltages applied to the common electrodes have three levels of voltages Vh, Vm, V1 (Vh > Vm > V1), and include, for writing a display content, a unit interval during which the voltages applied to the common electrodes have Vh and V1 and a unit interval during which the voltages applied to the common electrodes have Vm and V1.

16. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the common driver in such a way that the voltages applied to the common electrodes have four levels of voltages Vh, Vmh, Vm1, V1 (Vh > Vmh > Vm1 > V1), and include, for writing a display content, a unit interval during which the voltages applied to the common electrodes have Vh and V1, a unit interval during which the voltages applied to the common electrodes have Vm1 and V1, and a unit interval during which the voltages applied to the common electrodes have Vmh and Vm1.

17. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the segment driver in such a

way that the voltages applied to the segment electrodes have four levels of voltages V1, V2, V3 V4 (V1 >V2 > V3 > V4), and include, for writing a display content, a unit interval during which the voltages applied to the segment electrodes have V1, a unit interval during which the voltages applied to the segment electrodes have V1 and V2, and a unit interval during which the voltages applied to the segment electrodes have V3 and V4.

18. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the segment driver in such a way that the voltages applied to the segment electrodes have three levels of voltages V1, V2, V4 (V1 > V2 > V4), and include, for writing a display content, a unit interval during which the voltages applied to the segment electrodes have V1, a unit interval during which the voltages applied to the segment electrodes have V2 and 4.

19. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the segment driver in such a way that the voltages applied to the segment electrodes have three levels of voltages V1, V2, V4 (V1 > V2 > V4), and include, for writing a display content, a unit interval during which the voltages applied to the segment electrodes have V4, a unit interval during which the voltages applied to the segment electrodes have V1 and V2.

20. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the segment driver in such a way that the voltages applied to the segment electrodes have three levels of voltages V1, V2, V4 (V1 > V2 > V4), and include, for writing a display content, a unit interval during which the voltages applied to the segment electrodes have V2, a unit interval during which the voltages applied to the segment electrodes have V4, and a unit interval during which the voltages applied to the segment electrodes have V1 and V2.

21. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the segment driver in such a way that the voltages applied to the segment electrodes have three

levels of voltages V1, V2, V4 (V1 > V2 > V4), and include, for writing a display content, a unit interval during which the voltages applied to the segment electrodes have V1, a unit interval during which the voltages applied to the segment electrodes have V2, a unit interval during which the voltages applied to the segment electrodes have V4, and a unit interval during which the voltages applied to the segment electrodes have V2 and V4.

22. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the segment driver in such a way that the voltages applied to the segment electrodes have three levels of voltages V1, V2, V4 (V1 > V2 > V4), and include, for writing a display content, a unit interval during which the voltages applied to the segment electrodes have V1, a unit interval during which the voltages applied to the segment electrodes have V4, and a unit interval during which the voltages applied to the segment electrodes have V2 and V4.

23. The cholesteric liquid crystal display apparatus according to claim 12, wherein the controller controls the segment driver in such a way that the voltages applied to the segment electrodes have two levels of voltages.

24. The cholesteric liquid crystal display apparatus according to any one of claims 11-23, wherein the controller controls the common and segment drivers in such a way that the voltages applied to the common and segment electrodes have 42 volts or less.